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limitations of the base claim and any intervening claims is further acknowledged and appreciated.

Claim 15 has been rewritten into independent form to include all of the limitations of base claim 11. Base claim 11 has been cancelled and withdrawn from further consideration by the Examiner as a result. The dependencies of claims 16-18 have been changed to depend on the newly amended independent claim 15. The Applicants therefore respectfully submit that the newly amended claims 15-18 are now in condition for allowance. A reconsideration for allowance of claims 15-18 is respectfully requested of the Examiner.

Claim Rejections Under 35 USC §103

Claims 1-14 and 16-18 are rejected under 35 USC §103(a) as being unpatentable over Pant et al in view of Crevasse et al. It is contended that Pant discloses a method and apparatus for a linear CMP including a wafer carrier, a continuous belt, a motor means, a support platen, a plurality of openings in concentric circles, a pressure detector, a flow regulator, a process controller and a plurality of zones. While Pant does not disclose a gas source, the Examiner reasoned that such is taught by Crevasse

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of a gas source in a polishing apparatus for the purpose of providing air through apertures in a platen.

The rejection of claims 1-16, 8-10, 12-14 and 16-18 under 35 USC §103(a) based on Pant et al and Crevasse et al is respectfully traversed.

Independent claim 1 has been amended to more narrowly recite an invention contained therein:

"... a plurality of apertures therethrough and a plurality of openings in a top surface in fluid communication with a gas source through said plurality of apertures, said plurality of openings having different diameters."

The Applicants respectfully submit that a support platen that is equipped with a plurality of openings that have different diameters in a top surface is not taught or disclosed by Pant nor Crevasse, either singularly or in combination thereof.

Pant discloses a technique for controlling a polishing rate across a substrate surface when performing CMP including the

use of a support housing with a plurality of openings for dispensing a pressurized fluid.' (Abstract) The openings of Pant are configured into a number of groupings, in which a separate channel is used for each grouping so that fluid pressure for each group of openings can be separately and independently controlled. These separate groupings of openings are shown by Pant in Figs. 3, 5, 8-10 and 12. For instance, at col. 5, lines 7-12:

"within the center section 30, a series of openings 31 are formed, arranged in parallel rows 32. In the embodiment of Figs. 3-4, the rows are disposed in the direction of belt travel (rows are parallel to direction 16). For each row 32 of openings 31, a fluid channel 33 or 34 is disposed under the opening 31. Channel 33 is a dispensing channel for dispensing a pressurized fluid."

Again, at col. 5, lines 51-60:

"the degree of control and adjustments available will depend on a number of factors, including the number of channels 33, the number and size of openings 31, linear speed of the belt, rotational

speed of the wafer, height of the active center section 30, platen height, platen alignment and particularly the flow rate and pressure of the fluid being dispensed. In the embodiment shown in Figs.3-4, the opening 31 are approximately 0.020 inch in diameter and coupled to channels, each of which are formed from a 1/4 inch diameter tubing".

The Applicants respectfully submit that Pant does not teach or disclose a support platen that has a plurality of openings formed in a top surface in which the plurality of openings have different diameters. Such is also not taught by Crevasse, particularly in Figs. 2B and 2C where the openings provided are of equal size.

The rejection of claims 1-6, 8-10, 12-14 and 15-18 under 35 USC §103(a) based on Pant and Crevasse is respectfully traversed. A reconsideration for allowance of these claims is respectfully requested of the Examiner.

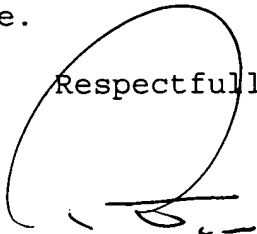
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Based on the foregoing, the Applicants respectfully submit that all of the pending claims, i.e. claims 1-6, 8-10 and 12-18, are now in condition for allowance. Such favorable action by the Examiner at an early date is respectfully solicited.

Attached hereto is a marked-up version of the changes made to the Abstract and claims by the current amendment. The attached page is captioned "Version With Markings To Show Changes Made".

In the event that the present invention is not in a condition for allowance for any other reasons, the Examiner is respectfully invited to call the Applicants' representative at his Bloomfield Hills, Michigan office at (248) 540-4040 such that necessary action may be taken to place the application in a condition for allowance.

Respectfully submitted,



Randy W. Tung
Reg. No. 31,311
Telephone: (248) 540-4040

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VERSION WITH MARKINGS TO SHOW CHANGES MADE

In The Abstract

The Abstract has been amended as follows:

-A linear chemical mechanical polishing apparatus that is equipped with a programmable pneumatic support platen and a method for controlling the polishing profile on a wafer surface during a linear CMP process are disclosed. The programmable pneumatic support platen is positioned juxtaposed to a bottom surface of a continuous belt for the linear CMP apparatus and positioned corresponding to a position of the wafer carrier so as to force the polishing pad against the wafer surface to be polished. The support platen has a predetermined thickness, a plurality of apertures through the thickness and a plurality of openings in a top surface in fluid communication with a gas source through the plurality of apertures. [The method for

controlling the polishing profile can be carried out by flowing a gas flow through the plurality of apertures and the plurality of openings to force an intimate contact between the wafer surface to be polished and the polishing pad. The plurality of openings may be suitably arranged in various control zones on the surface of the support platen with each zone equipped with a pressure detector and a flow regulator such that the gas flow pattern can be programmed to any desirable pattern for achieving polishing uniformity on a wafer surface.]

In The Claims

Claims 7 and 11 have been cancelled without prejudice.

Claim 1 has been amended as follows:

1. (Amended) A linear chemical mechanical polishing apparatus equipped with a programmable pneumatic support platen comprising:

a wafer carrier for holding and rotating a wafer mounted thereon with a first surface to be polished exposed and facing downwardly;

a continuous belt for mounting a plurality of polishing pads thereon;

a motor means for providing rotational motion in a predetermined direction of said continuous belt; and

a support platen situated juxtaposed to a bottom surface of said continuous belt corresponding to a position of said wafer carrier so as to force said polishing pad against said first surface of the wafer, said support platen having a predetermined thickness, a plurality of apertures therethrough and a plurality of openings in a top surface in fluid communication with a gas source through said plurality of apertures, said plurality of openings having different diameters.

Claim 15 has been amended as follows:

15. (Amended) A method for controlling the polishing profile on a wafer surface during a linear [chemical mechanical polishing] (CMP) process [according to claim 11 further] comprising the steps of:

providing a linear CMP apparatus comprising a wafer carrier for holding and rotating a wafer mounted thereon with a first surface to be polished exposed and facing downwardly; a continuous belt for mounting a plurality of polishing pads thereon; a motor means for providing rotational motion of said continuous belt; and a support platen situated juxtaposed to a bottom surface of said continuous belt corresponding to a position of said wafer carrier, said support platen having a predetermined thickness, a plurality of apertures therethrough and a plurality of openings in a top surface in fluid communication with a gas source;

rotating said continuous belt in a predetermined direction;

engaging said first surface of the wafer to said polishing pad;

flowing a gas flow through said plurality of apertures and said plurality of openings and forcing an intimate contact between said first surface of the wafer and said polishing pad;

detecting a pressure of gas flow through a preselected zone incorporating a preselected plurality of openings and sending a first signal to a process controller;

comparing said first signal with a pre-stored value in the process controller and sending a second signal to a flow regulator responsive to said preselected zone; and

altering said pressure of said gas flow responsive to said second signal until said first signal substantially equals to said pre-stored value in the process controller.

Claim 16 has been amended as follows:

16. (Amended) A method for controlling the polishing profile on a wafer surface during a linear CMP process according to claim [11] 15 further comprising the step of flowing a gas flow of air or nitrogen through said plurality of apertures and said plurality of openings.

Claim 17 has been amended as follows:

17. (Amended) A method for controlling the polishing profile on a wafer surface during a linear CMP process according to claim [11] 15 further comprising the step of dividing said plurality of openings in at least three zones wherein each zone being arranged in a concentric circle.

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Claim 18 has been amended as follows:

18. (Amended) A method for controlling the polishing profile on a wafer surface during a linear CMP process according to claim [11] 15 further comprising the step of dividing said plurality of openings in about six zones wherein each zone being arranged in a concentric circle.